

Amendments to the Drawings:

Please replace the drawing sheets containing Figs. 1, 2 and 4 with the drawing sheets presented in Appendix I of this paper.

REMARKS

The Office Action mailed on January 13, 2006, has been reviewed and the comments of the Patent and Trademark Office have been considered. Prior to this paper, claims 22-43 were pending. By this paper, Applicants do not cancel or add any claims. Therefore, claims 22-43 remain pending.

Various claims stand amended. Support for these claim amendments may be found, among other places, in Fig. 4 as originally filed.

Applicants respectfully submit that the present application is in condition for allowance for at least the reasons that follow.

Objections to the Drawings

The drawings are objected to “because the figures should include descriptive labeling to help in understanding the figures,” although no statute or rule (or even MPEP section) is cited substantiating the grounds for rejection. Regardless, without prejudice or disclaimer, in order to advance prosecution, Applicants submit herewith, on separate substitute sheets, revised Figs. 1, 2 and 4. Applicants respectfully request that the objection to the drawings be removed in light of these amendments.

Rejections Under 35 U.S.C. § 102

Claims 22, 25-26, 30-35, and 41-43 stand rejected under 35 U.S.C. §102(b) as being anticipated by Yin (United States Patent No. 6,386,050). In response, Applicants have amended independent claims 22 and 33 as seen above, and respectfully submit that the above claims are allowable for at least the reasons that follow.

Applicants rely on MPEP § 2131, entitled “Anticipation – Application of 35 U.S.C. 102(a), (b), and (e),” which states that a “claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art

reference.” Section 103 amplifies the meaning of this anticipation standard by pointing out that anticipation requires that the claimed subject matter must be “**identically disclosed or described**” by the prior art reference. (Emphasis added.) It is respectfully submitted that Yin does not describe each and every element of either of independent claims 22 and 33 as currently pending, and thus none of the dependent claims.

Claim 22, as amended recites a liquid metering device comprising, among other elements, a beam splitter adapted to split the at least one beam into a first beam and a second beam directed along respective first and second beam paths, wherein at least one of:

(i) the first beam path passes, ***with respect to a first side of the conduit, all the way through the conduit and through the lumen*** at a second position along the conduit and the second beam path ***does not pass through the lumen of the conduit***, and

(ii) the first beam path ***crosses the lumen at the second position along the conduit*** and the second beam path ***does not enter the lumen of the conduit and does not enter the wall of the conduit***.

Claim 22 further recites a device adapted ***to combine the first and second beams after the first beam has at least one of passed all the way through the lumen and crossed the lumen, respectively***, such that the first and second beams undergo ***a degree of interference***, and an optical detector adapted to detect ***an intensity variation of the combined first and second beams*** caused by a heated portion of the liquid passing through the first beam.

Yin does not teach these elements. In Yin, there is no first beam path that passes, with respect to the beam splitter, all the way through the conduit and through the lumen, and a second beam path that does not pass through the lumen of the conduit, **along with** a device that combines these first and second beams after the first beam has passed all the way through the lumen, such that the first and second beams undergo a degree of interference, **and along with** a detector that detects an intensity variation of the combined first and second beams. In Yin, **all detected** intensity variations (assumed *arguendo* to be present) of combined beams that undergo a degree of interference are a result of beams that do not pass ***all the way through*** the conduit and through the lumen. Instead, in Yin, **all the combined beams enter at least part of the conduit** - the beams reflecting off the first conduit-lumen interface and the second conduit-lumen interface, as is shown in Fig. 1.

Moreover, in Yin, there is no first beam path that ***crosses the lumen at the second position along the conduit*** and a second beam path ***does not enter the lumen of the conduit and does not enter the wall of the conduit, along with*** a device that combines these first and second beams after the first beam has crossed the lumen, such that the first and second beams undergo a degree of interference, and a detector that detects an intensity variation of the combined first and second beams. In Yin, all detected intensities variations (assumed *arguendo* to be present) of combined beams that undergo a degree of interference are a result of beams that enter the wall of the conduit and enter the lumen. In Yin, all the combined beams enter at least one of (a) the wall of the conduit and (b) the lumen. Claim 22 is therefore not anticipated by Yin.

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Claim 33, the only other independent claim, recites a method of metering a liquid, including recitations concomitant with those of claim 22 vis-à-vis the arguments just detailed. Therefore, claim 33 is allowable for the pertinent reasons detailed above that make claim 22 allowable.

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There are reasons why many of the dependent claims are not anticipated by the teachings of Yin in addition to their dependency from allowable independent claims. For example, claims 25 and 34 recite that the wall of the conduit is a glass wall or a polymer wall. The Office Action recognizes that Yin does not teach this recitation, and instead asserts that it is “*inherent* that the wall is a glass wall or a polymer wall.” (Emphasis added.) This is not the case.

Applicants respectfully rely on MPEP § 2112, which states that while “a rejection under 35 U.S.C. §102/103 can be made when the prior art product seems to be identical except that the prior art is silent to an inherent characteristic,” the “[E]xaminer *must* provide rationale or evidence tending to show inherency.” (MPEP § 2112, subsections 3 and 4, emphasis added.) It is respectfully submitted that no evidence tending to show inherency has been provided in the present Office Action. Further, in considering the examples provided in the Office Action to support an inherency argument, in pointing to the text of Yin at col. 5, lines 49-64, it is respectfully submitted that § 2112 inherency is not being properly

implemented. In arriving at this conclusion, Applicants rely on the following excerpt from MPEP § 2112:

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijkaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.’” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted) (The claims were drawn to a disposable diaper having three fastening elements. The reference disclosed two fastening elements that could perform the same function as the three fastening elements in the claims. The court construed the claims to require three separate elements and held that the reference did not disclose a separate third fastening element, either expressly or inherently.)

(Emphasis added.) Inherency means that *the missing descriptive matter is necessarily present* in the reference. The courts have allowed the PTO to rely on inherency arguments to free the PTO from the necessity of finding references which explicitly state that inherent elements are present. This is because certain characteristics are inherent, the references will most probably not mention these elements, and, as such, will be difficult to find. For example, it is not necessary to find a reference that explicitly states that plutonium 239 is radioactive, as plutonium 239 is always radioactive. That is, radioactivity is an inherent feature of plutonium 239. However, inherency is not a panacea that enables the PTO to use references which are *deficient* in teaching certain elements of a claim. Recognizing the power of the inherency argument, the courts have tempered its use, as is seen in § 2112, where the PTO has stipulated that examiners must follow certain procedures before invoking inherency: the “examiner must provide rationale or evidence tending to show inherency.” In the present case, no such rationale or evidence has been provided in the Office Action. The statement that it is

“inherent that the wall is a glass wall or a polymer wall” does not satisfy the PTO’s burden to provide rationale or evidence showing that “the missing descriptive matter is necessarily present.” Just because it may be desirable to have a glass wall or a polymer wall with such properties does not mean that such properties are always present. Just the opposite is true: it is entirely possible that someone would practice Yin with a wall that is not glass or a polymer. The subject matter claimed in claims 25 and 34 is not *necessarily present* in the references. It is entirely probable that the conduit of Yin will be practiced without a glass or polymer conduit. Just as was the case of the third fastener in the example provided in the MPEP quoted above, the subject matter of Applicants’ claims is not expressly or inherently disclosed in Yin. Thus, a reference that explicitly teaches these limitations must be found, else the claims must be allowed. Because Yin is silent in regard to the additional subject matter claimed in claims 25 and 34, these claims are allowable.

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Claims 26 and 35 are also allowable for additional reasons due to their dependency from allowable independent claims. These claims recite that the conduit has a lumen with a rectangular or square cross section. The Office Action asserts that Fig. 1 depicts such a conduit/lumen. Fig. 1 is a cross section of a conduit with a lumen, ***taken in the axial direction, not the “radial” direction or the like.*** Because of this, neither the artisan of ordinary skill, nor the artisan of extraordinary skill, can determine whether the cross section depicts a circular lumen, a rectangular lumen, an octagon lumen, *etc.* The cross section would look exactly the same for a circular lumen as it would for an rectangular lumen, because it is taken in the axial direction. Therefore, claims 26 and 35 are allowable for additional reasons.

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In sum, no pending claim is anticipated by Yin for at least the reasons detailed above. Reconsideration is requested.

Claim Rejections Under 35 U.S.C. §103(a)

In the Office Action, Claim 27 is rejected under 35 U.S.C. §103(a) as being unpatentable over Yin in view of Kerlin (U.S. Patent No. 4,777,368), and claims 22-26 and 28-43 are rejected in view of the combination of Yin in view of Johnson (U.S. Patent No.

3,511,227). Claim 27 is further rejected in view of Yin when combined with Kerlin and Johnson. Applicants respectfully traverse the rejection as to the claims above, and submit that these claims are allowable for at least the following reasons.

Applicants rely on MPEP § 2143, which states that:

[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

It is respectfully submitted that none of the criteria of MPEP § 2143 have been met in the Office Action.

The Cited References Do Not Suggest All Claim Recitations

Even if the first and second requirements of MPEP § 2143 were satisfied in the Office Action (which they are not, as explained below), the cited references still do not meet the third requirement, which is that “the prior art reference (or references when combined) must teach or suggest all the claim limitations.”

Claims 22 and 33: The Office Action introduces Johnson in an attempt to remedy *some* of the above-identified deficiencies of Yin with respect to these claims (under the assumption that Yin may be interpreted not to disclose some of the above-identified elements), asserting that Johnson teaches “a device adapted to combine the first and second beams after the first beam has passed *through the conduit* such that the first and second beams *undergo a degree of interference (inherent)*.” (Emphasis added.)

Johnson does not teach interference, and the beams of Johnson do not inherently interfere with one another as claimed.¹ In Johnson, the spatial coherence of the reflected beam reflected off of the blood particles is ***destroyed***, and, thus, when the beams are again combined, because there is no spatial coherence between the two beams, there is no interference (interference relies on the retention of spatial coherence). However, the temporal coherence is retained. In this regard, Johnson utilizes a ***Doppler-shift*** (*i.e.*, wavelength change) in a light beam to detect movement of a particulate flow, such as blood flow. Johnson can do this because the temporal coherence is retained. Johnson compares beam 42, the beam with the Doppler-shifted wavelength (the reflected light from the light injected into the blood stream by beam 32), to that of beam 34 without the Doppler-shifted wavelength (the light split off beam splitter 36 to mirror 44). The beams are compared by combining the beams- the non-Doppler-shifted beam serving as the reference: “the reference beam 34 and the Doppler-shifted beam 42 are coincident in the region between the beam splitter 48 and the detector 50. Accordingly, the detector 50 puts out an electrical signal representing the difference ***frequency*** [sic] between the two beams 34 and 42.” (Johnson, col. 3, lines 65-69, emphasis added.) That is, all that Johnson is doing is comparing the different ***frequencies*** of the two beams. ***He is not utilizing interference, nor is he detecting an interference pattern.***

Johnson also does not teach “an optical detector adapted to detect an ***intensity variation of the combined*** first and second beams caused by a heated portion of the liquid passing through the first beam.” (Emphasis added.) As just explained, all that Johnson is doing is detecting a frequency change of a light beam due to the passage of fluid. Johnson is not detecting an intensity change. Because neither Yin nor Kerlin teach or suggest this feature of the claims, these claims are allowable.

Claims 23-24 and 38-40: These claims recite that ***an optical phase delay element*** is located in one of the first and second beam paths. As detailed in the specification, an

¹ Applicants refer to the above discussion regarding inherency, and do not repeat those points vis-à-vis the assertion of inherency in the Office Action in the interests of economy. However, Applicants traverse the assertion that interference occurs each and every time the beams of Johnson are combined.

optical delay element is an element that delays the beam by, for example, $\frac{1}{2}$ the wavelength, *etc.*

The Office Action alleges that filter 46 of Johnson meets the recitations of claims 23-24 and 38-40. Specifically, the Office Action asserts that filter 46 “broadly reads on the claimed optical phase delay element.” This is not the case, and no evidence of such has been proffered by the Office Action. The ordinary artisan would recognize that an optical phase delay element is not a filter, and that an “optical phase delay element” cannot be so broadly construed.

The Office Action’s broad definition of an “optical phase delay element” does not comport with case law cited in the MPEP for determining the plain meaning of a claim term. The Office Action’s definition ignores the MPEP’s requirement that claim terms (1) must be given their plain meaning, and (2) the plain meaning must be the meaning given to the term by those of ordinary skill in the art. Neither has been done with respect to these claims.

It appears that the Office Action is relying (incorrectly) on common knowledge in the art, as is discussed and permitted in MPEP § 2144.03, to satisfy the third requirement of MPEP § 2143. However, Applicants note that § 2144.03 allows an applicant “to traverse such an assertion,” and that when an applicant does so, “the examiner should cite a reference in support of his or her position.” (MPEP § 2144.03, second paragraph.) Absent a citation by the PTO of a reference that can be evaluated for all its teachings, Applicants hereby traverse the assertion that it would have been common knowledge in the art that the filter 46 of Johnson would fall under the claim element of an “optical phase delay element.” **Applicants thus request, relying on § 2144.03 that the PTO cite a reference and exactly identify where such a reference teaches the alleged broad scope of an “optical phase delay element,” else allow the claims.**

Claims 25, 26, 34 and 35: As detailed above in the *Anticipation Section*, Yin does not teach, either explicitly or inherently, all the elements of these claims, and the Office

Action does not assert that Johnson remedies the deficiencies of Yin in this regard. Thus, these claims are allowable for additional reasons than their dependency from the allowable independent claims.

Claim 27: Claim 27 is allowable due at least to its dependency from claim 22, an allowable claim, as Kerlin is not alleged to remedy any of the above-mentioned deficiencies of claim 22.

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In sum, even if the first and second requirements of MPEP § 2143 are satisfied, the third requirement of MPEP § 2143 is not satisfied in the Office Action, since the cited references do not teach each and every element of the present invention. Thus, the present claims are allowable.

Lack of Suggestion or Motivation to Modify or Combine the References

MPEP § 2143.01 states that “the prior art *must* suggest the desirability of the invention.” (MPEP § 2143.01, subsection 1, emphasis added.) The Office Action broadly asserts that it “would have not [sic] been obvious to modify Yin’s system to include the beam splitter and the combiner as a mere alternative to a beam being split by the wall of the conduit.” (Emphasis added.) Applicants traverse this rationale for motivation to modify Yin on multiple grounds, submitting that no sufficient motivation to modify Yin has yet been proffered by the PTO.

First, no evidence has been identified teaching that, in this art, a beam splitter and combiner is recognized by the ordinary artisan to be a mere alternative to a beam being split by a wall of a conduit. The simple assertion of “alternativeness,” without more, is insufficient to provide proper motivation to modify the prior art. If such was not the case, a *prima facie* case of obviousness could be established for any invention that combines

elements already present in the prior art (which is always the case when the third requirement of MPEP § 2143 is met), by simply asserting “alternativeness.” This would eviscerate the first requirement of MPEP § 2143.

Second, even if such was recognized, it still does not provide motivation to combine the first and second beams after the first beam has at least one of passed all the way through the lumen and crossed the lumen such that the first and second beams *undergo a degree of interference*, and to utilize an optical detector adapted to detect an *intensity variation of the combined* first and second beams caused by a heated portion of the liquid passing through the first beam. That is, assuming *arguendo* that it would have been obvious to utilize a beam splitter and combiner in Yin, it still does not mean that it would have been obvious to combine the beams and to detect an intensity variation of the combined beams, as is claimed. Under the Office Action’s rationale for modifying Yin, all that would result is, at most, the simple replacement of parts. Applicants note that the claims recite more than just the mere collection of various optical and fluidic components - the claims recite an arrangement of those components, an arrangement not present in Yin, and an arrangement that would not have been obvious to the ordinary artisan even if the separate parts would be a “mere alternative to a beam being split by a wall of a conduit.”

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MPEP 2142, entitled “Legal Concept of *Prima Facie* Obviousness,” states that “impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.” (Emphasis added.) Applicants provide a rationale for splitting and combining the beams to obtain a degree of interference. It appears that the Office Action is utilizing the Applicants’ own disclosure against them for motivation to modify the prior art. While it is permissible under certain circumstances to use teachings in the “background section” of an application to teach missing *elements* of the prior art, it is impermissible to use Applicants’ application against them for motivation to combine or modify references.

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MPEP § 2143.01, subsection 6 states that “the proposed modification cannot change the principle of operation of a reference – If the proposed modification or combination of the

prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810 (CCPA 1959).” In *Ratti*, the CCPA held that the “suggested combination of references would require a substantial reconstruction and redesign of the elements shown in the primary reference.” This substantial redesign would have resulted in changing a rigid seal to a resilient seal. Thus, a reference cannot be modified to render an invention obvious if the modification changes a principle of operation of the reference.

With the above in mind, it is respectfully submitted that because the teachings of Yin rely on movement of interference patterns in clear fluids as its principle of operation, and the teachings of Johnson rely on detecting the Doppler-shift in light from a beam that has been injected into a non-clear fluid such as blood, utilizing the components of Johnson (identified in the Office Action), which are used to obtain and detect the Doppler-shift, in Yin, would change the principle of operation of Yin. Because modifying Yin to utilize Doppler-shifting components changes the principle of operation of Yin, just as changing the rigid seal to a resilient seal was found to change the principle of operation in *Ratti*, “the teachings of [Yin] are **not sufficient** to render the claims *prima facie* obvious.” (MPEP § 2143.01, emphasis added.)

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In summary, because of the lack of suggestion or motivation in the prior art to modify the cited references, the first requirement of MPEP § 2143 has not been met and, hence, a *prima facie* case of obviousness has not been established.

Lack of a Reasonable Expectation of Success

MPEP § 2143.02 permits references to be modified or combined to reject a claim as obvious only if there is a reasonable expectation of success. There is no evidence in the references, and certainly none identified in the Office Action, that one of ordinary skill in the art would have had a reasonable expectation of success in achieving Applicants’ invention by combining the cited references. For example, as detailed above, Yin measures the velocity of

a clear fluid through interferometry, and Johnson measures the velocity of a particulate flow, such as blood, using a Doppler-shift. No evidence has been proffered that the ordinary artisan would have believed, in the 2002 timeframe (the timeframe of the filing date of the parent application of this application), that Yin could be modified utilizing the Doppler-shift components of Johnson to arrive at the invention as claimed. (Applicants note that this example is simply a starting point for a showing of a reasonable expectation of success; more would be needed.) Thus, one of ordinary skill in the art would not have seen the combination of the references as producing a successful liquid metering device as claimed. Because of this, the second criteria of MPEP § 2143 has not been met in the Office Action, and a *prima facie* case of obviousness has therefore not been established.

Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Examiner Alsomiri is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

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